COMPUTERS & GEOSCIENCES

List of Contents and Author Index
Volume 14, 1988

PERGAMON PRESS
OXFORD · NEW YORK · BEIJING · FRANKFURT
SÃO PAULO · SYDNEY · TOKYO · TORONTO

COMPUTERS & GEOSCIENCES

An International Journal devoted to the rapid publication of computer programs in widely used languages and their applications

Editor-in-Chief:
D. F. Merriam, Stratigraphic Studies Group, Box 153, Wichita State University, Wichita, KS 67208, USA
BITNET:SSGWSU at TWSUVM Fax: 316 689-3770 Telex: 417 423

Regional Editors:
J. M. Cubitt, Poroperm Laboratories Ltd, Chester Street, Saltney, Chester CH4 8RD, UK
D. M. Hawkins, Department of Applied Statistics, University of Minnesota, St Paul, MN 55108, USA
R. J. Howarth, BP Research Centre, Chertsey Road, Sunbury-on-Thames, Middlesex TW16 7LN, UK
R. W. Le Maitre, Department of Geology, University of Melbourne, Parkville, Victoria 3052, Australia

Book Review Editor:
P. G. Sutterlin, Department of Geology, Wichita State University, Wichita, KS 67208, USA

Editorial Advisory Board
F. P. Agterberg (Canada)
G. F. Bonham-Carter (Canada)
J. C. Brower (USA)
L. Carbognin (Italy)
F. Chayes (USA)
A. C. Cook (Australia)
M. L. Crawford (USA)
G. de Marsily (France)
I. Djafarov (USSR)
J. Doveton (USA)
R. Ehrlich (USA)
A. G. Fabbri (Canada)
J. K. Hall (Israel)
J. T. Hanley (USA)
U. C. Herzfeld (West Germany)
A. Khan (UK)
E. Kirova (Nigeria)
Liu Chengzuo (China)
N. Nishiwaki-Nakajima (Japan)
J. E. Nordstrom (USA)
M. Pena Daza (Bolivia)
J. E. Robinson (USA)
W. Scherer (Venezuela)
J. H. Schuenemeyer (USA)
W. Schwarzacher (UK)
B. R. Shaw (USA)
H. Teil (France)
J. C. Tipper (Australia)
G. V. Wolf (USA)
P. J. Yarka (USA)

Officers and Council of the IAMG (1984–1989)
President: J. C. Davis (USA)
Past President: E. H. T. Whitten (USA)
Vice President: P. Switzer (USA)
Secretary General: R. B. McCammon (USA)
Treasurers: M. Ed. Hohn (USA)
V. T. Vuchev (Bulgaria)

Council Members
I. Clark (UK)
J. M. Cubitt (UK)
D. Gill (Israel)
A. Marachel (France)
R. Sinding-Larsen (Norway)
G. Williams (Canada)
Editor of *Journal of Mathematical Geology:*
C. J. Mann (USA)
Editor-in-Chief of *Computers & Geosciences:*
D. F. Merriam (USA)

Publishing Office: Journals Production Unit, Pergamon Press plc, Hennock Road, Marsh Barton, Exeter, Devon EX2 8NE, UK (*Tel.* Exeter (0392) 51558; *Telex* 42749).

Subscription and Advertising Offices: *North America*: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, USA; *Rest of the World*: Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, UK (*Tel.* Oxford (0865) 64881).

Published 6 issues/annum (increasing to 8 issues/annum in 1989): Annual institutional subscription rate (1989) DM 840.00; 2-year institutional rate (1989/90) DM 1596.00; personal subscription rate for those whose library subscribes at the regular rate (1989) DM 120.00. Prices are subject to amendment without notice.

Microform Subscriptions and Back Issues: Back issues of all previously published volumes are available direct from Pergamon Press. Back issues of Pergamon journals in microform can be obtained from UMI, 300 North Zeeb Road, Ann Arbor, MI 48106, USA

Copyright © 1988 Pergamon Press plc

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required for authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

PHOTOCOPYING INFORMATION FOR USERS IN THE USA

The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use: The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-fee Code for this publication is: 0098-3004/88 $3.00 + 0.00

List of Contents

NUMBER 1

i Softstrip® data strip containing the table of contents for this issue

B. J. Larkin 1 A FORTRAN 77 program to calculate areas of intersection between a set of grid blocks and polygons

Roger L. Nielsen 15 TRACE.FOR: a program for the calculation of combined major and trace-element liquid lines of descent for natural magmatic systems

M. B. Boisen, Jr. and **G. V. Gibbs** 37 MATOP: an interactive FORTRAN 77 program for solving problems in geometrical crystallography

Robyn Wright and **Steven M. Thornberg** 55 SEDIDAT: a BASIC program for the collection and statistical analysis of particle settling velocity data

Colin R. Ward and **Andrew E. Waltho** 83 A BASIC program for in-field entry of lithologic descriptions in borehole logs to a hand-held portable computer system

Kevin McCartney 99 SILICO: a computer program for the three-dimensional measurement of silicoflagellate skeletons

Witold F. Krajewski and **Christopher J. Duffy** 113 Estimation of correlation structure for a homogeneous isotropic random field: a simulation study

Short Notes

Václav Bezvoda, Josef Ježek, and **Karel Segeth** 123 A comment on "A computer program to perform transformations of gravimetric and aeromagnetic surveys"

Peter R. Sutcliffe 125 Fourier transformation as a method of reducing the sampling interval of a digital time series

Daniel O. Hayba 131 A BASIC program for locating references cited in geoscience manuscripts

Thomas A. Jones 135 Geostatistical models with stratigraphic control

NUMBER 2

i Softstrip® data strip containing the table of contents for this issue

Mark A. Herkommer 139 Procedures for creating a benchmarking data set

Uwe Brand and **Edward G. Lorek** 151 Computer analysis of atomic absorption spectrophotometer generated data: BASIC and FORTRAN 77 programs

Paul T. Delaney 181 FORTRAN 77 programs for conductive cooling of dikes with temperature-dependent thermal properties and heat of crystallization

Thomas P. Frost and **James R. Lindsay** 213 MAGMIX: a BASIC program to calculate viscosities of interacting magmas of differing composition, temperature, and water content

Peter F. Fisher and **Peter Galdies** 229 A computer model for barchan-dune movement

Richard J. Lisle 255 ROMSA: a BASIC program for paleostress analysis using fault-striation data

B. Allard and **C. Sotin** 261 Determination of mineral phase percentages in granular rocks by image analysis on a microcomputer

Short Note

M. O. Onyekonwu and **M. Abiye** 271 Prediction of dimensionless pressure during production from a circular reservoir with generalized boundary conditions

NUMBER 3

i Softstrip® data strip containing the table of contents for this issue

Thomas H. Brown, Robert G. Berman, and **Ernest H. Perkins** 279 GeO-Calc: software package for calculation and display of pressure–temperature–composition phase diagrams using an IBM or compatible personal computer

Kenneth L. Cameron, Debra D. Cameron, and **Patrick C. Kelleher** 291 Producing geological illustrations using PC-based computer-aided drafting

C. W. Pope, B. Cairncross, A. B. Cadle, and **T. S. McCarthy** 299 A revised FORTRAN IV computer program for displaying coal-bearing sedimentary data

Mark Noel and **Mark D. Rudnicki** 321 A computer program for determining current directions from rock magnetic data

G. F. Bonham-Carter 339 Numerical procedures and computer program for fitting an Inverted Gaussian Model to vegetation reflectance data

J. D. Fenton 357 The numerical solution of steady water wave problems

Maurizio Ripepe 369 StrataBase: a stratigraphical database and processing program for microcomputers

H. V. Ram Babu and **D. Atchuta Rao** 377 Inversion of self-potential anomalies in mineral exploration

J. L. Jensen 389 Maximum-likelihood estimation of the hyperbolic parameters from grouped observations

Short Note
Stephen J. Barnes 409 Automated plotting of geochemical data using the Lotus SYMPHONY package

NUMBER 4

i Softstrip® data strip containing the table of contents for this issue

G. V. Haines 413 Computer programs for spherical cap harmonic analysis of potential and general fields

H. de Mooy, J. T. A. van Hattum, and **S. P. Vriend** 449 A RQ-mode factor-analysis program for microcomputers. A Pascal program

M. Hattingh 467 A new data adaptive filtering program to remove noise from geophysical time- or space-series data

Scott J. Hills 481 Outline extraction of microfossils in reflected light images

Marijke van Heeswijk and **Christopher G. Fox** 489 Iterative method and FORTRAN code for nonlinear curve fitting

Peter J. J. Friedinger 505 BASTA—subsidence and paleotemperature modeling of rift basins

Nagarajan Prabhakaran and **Gautam Sen** 527 THERMOBAR: a Pascal program for calculating pressure and temperature of mantle rocks

Short Note
L. J. Poppe, J. J. Fredericks, and **J. C. Hathaway** 541 A computer program to calculate centrifugation parameters for sedimentation analyses

NUMBER 5

i Softstrip® data strip containing the table of contents for this issue

G. T. Thompson and **S. J. Balch** 547 An efficient algorithm for polynomial curve fitting

Christian Christiansen and **Daniel Hartmann** 557 SAHARA: a package of PC computer programs for estimating both log-hyperbolic grain-size parameters and standard moments

Lawrence W. Martz and **Eeltje de Jong** 627 CATCH: a FORTRAN program for measuring catchment area from digital elevation models

Donald O. Doehring, Wayne A. Charlie, and **George E. Veyera** 641 An APL function for modeling *p*-wave induced liquefaction

Matthew J. Kramer 645 GENPLOT: a formula-based Pascal program for data manipulation and plotting

John Broome 659 An IBM-compatible microcomputer workstation for modeling and imaging potential field data

Evangelos A. Yfantis and **George T. Flatman** 667 On sampling nonstationary spatial autocorrelated data

Ramesh Kumar T. Reddy 687 Microcomputer programs to manage and analyze digitized geological data—applications in exploration modeling

U. C. Herzfeld and **M. A. Sondergard** 699 MAPCOMP—a FORTRAN program for weighted thematic map comparison

Short Note
J. G. Tough 715 The computation of the area, centroid, and principal axes of a polygon

NUMBER 6

SPECIAL ISSUE

BIBLIOGRAPHY OF COMPUTER APPLICATIONS IN THE EARTH SCIENCES, 1948–1970

Introduction v

Bibliography 719

Appendix 1 917 Subject codes

Appendix 2 919 Index

I Softstrip® data strip containing the table of contents for this issue